Posters

PO0126

Improvement of lower limb functioning in ambulatory chronicle stroke patients undergoing robot-assisted training

Nicolas Perret [1,*], Rolf Frischknecht [2], Stefano Carda [2], Françoise Sandoz [2], Aurelien Fauquex [3], Yannick Charrotton [3]

[1] *Haute école de Sante-Vaud, maitre d'enseignement, Lausanne, Suisse*
[2] *Centre hospitalier universitaire Vaudois, neuropsychologie et neuroréhabilitation, Lausanne, Suisse*
[3] *Haute école d'ingénierie et de gestion du canton de Vaud, Yverdon-les-Bains, Suisse*
* *Corresponding author.*
E-mail address: nicolas.perret@hesav.ch (N. Perret)

Objective To study the effect of a robot assisted motor training program of the lower limbs on locomotor functioning of chronic stroke patients.

Materials/patients and methods After ethical committee approval, 5 women and 2 men with chronic hemiplegia 2, 20 years after stroke (1 right, 6 left), age 35 and 79, underwent a robot assisted training of their lower limbs twice a week for 6 weeks. During the 30′s exercise sessions (leg press and cycling), the participants used an end effector type rehabilitation robot (Lambda Health System plc) and were asked to follow actively the robot-guided movements. Participants were assessed before and after the training program (cf. below). Differences were analysed using Wilcoxon signed rank test.

Results Six participants out of 7 reported improvement of functioning such as reduced toe drag during walking, improved foot dorsiflexion when crossing obstacles and climbing stairs as well as increased stability during the stance phase on the hemiplegic side. The timed up-and-go test improved from 13.6 ± 4.5 (mean $\pm$ SD) to 12.5 ± 4.4 s ($P = 0.176$) and the 10 m walking test at comfortable speed from 7.0 ± 2.8 to 6.5 ± 1.9 s ($P = 0.735$). The 10 m walking test at maximum speed remained unchanged. On the affected side, the motricity index for the lower limbs improved from 73.90 ± 6.2 to 77.3 ± 7.8 ($P = 0.066$), the composite lower limb Ashworth spasticity score decreased from 4.1 ± 3.9 to 2.9 ± 3.4 ($P = 0.004$), the active internal hip rotation increased from 12.9 ± 7.6 to 20.8 ± 3.5 ($P = 0.041$) and the active ankle dorsiflexion increased from -12.1 ± 20.8 to -3.6 ± 17.0 ($P = 0.102$).

Discussion/Conclusion The spasticity decrease after training confirms previous findings on repetitive movement effects on tonus 1. The improvement of active internal hip rotation might be related to the need of active hip stabilisation in the horizontal plane to maintain the limb alignment during training. The amelioration of the other parameters didn't reach statistical significance probably due to the low sample size. However, these improvements might also have contributed to the positive effects reported by the participants.

Keywords Stroke; Rehabilitation robotics; Exercice; Spasticity; Mobility

Disclosure of interest Lambda Health System is a start up company in creation as a spin off from Haute école d'ingénierie et de gestion du canton de Vaud, Haute école de santé Vaud and centre hospitalier universitaire Vaudois.